

## **REMARKS/ARGUMENT**

### **Regarding the Claims in General:**

Claims 35, 36, 40, 47-49, 60, 64-65, and 67-118, and 62-92 are now pending before the Examiner. By the present Amendment, claims 8-13, 62, 63, and 66 have been rewritten as new claims 67-69, 72-75, and 85. For the Examiner's convenience, the correspondence of the rewritten and previous claims is set forth in the table below.

Previous Claim	Present Claim	Previous Claim	Present Claim
8	67	62	76
9	68	63	69
10-13	72-75	66	85

Further, claims 36, 40, 47, 64, and 65 have been amended, and claims 34, 41 and 42 have been canceled without prejudice or disclaimer. Claims 1-7, 14-33, 37-39, 43-46, 50-59 and 61, previously withdrawn from consideration, have also been canceled.

New claims 70, 71, 77-84, and 86-118 have been added to provide applicants with additional protection to which they appear to be entitled in view of the prior art.

The presently pending claims take account of Lindermeir et al. U.S. Patent No. 5,226,599 (Lindermeir), which was brought to the Examiner's attention by way of an Information Disclosure Statement filed July 20, 2006.

### **Regarding the Personal Interview Held July 27, 2006:**

Applicants' representative gratefully acknowledges the courtesy and assistance afforded to him by Examiners Jessica Harrison, one of the SPRE's for Technology Center 3700, and Davis Hwu, the Examiner responsible for this application, during the interview held on July 27, 2006. During the interview, the discussion centered around the significance of Lindermeir relative to the present invention, and also current practice under 37 C.F.R. 41.202 *et seq.* relative to a possible interference

with an issued patent, the independent claims of which are believed also to be unpatentable under 35 U.S.C. 102 and/or 35 U.S.C. 103 in view of Lindermeir.

### **Regarding the Prior Art:**

Applicants' position with respect to the patentability of the claims, including those amended herein, over Larsen U.S. Patent 5,975,430 and Clark U.S. Patent 6,242,158, as stated in the communication dated May 12, 2006 remains unchanged, and will not be repeated in the interest of brevity. For the record, however, a description of the apparatus disclosed in Lindermeir, and applicants' position relative to the patentability of the pending claims over this new reference are set forth below.

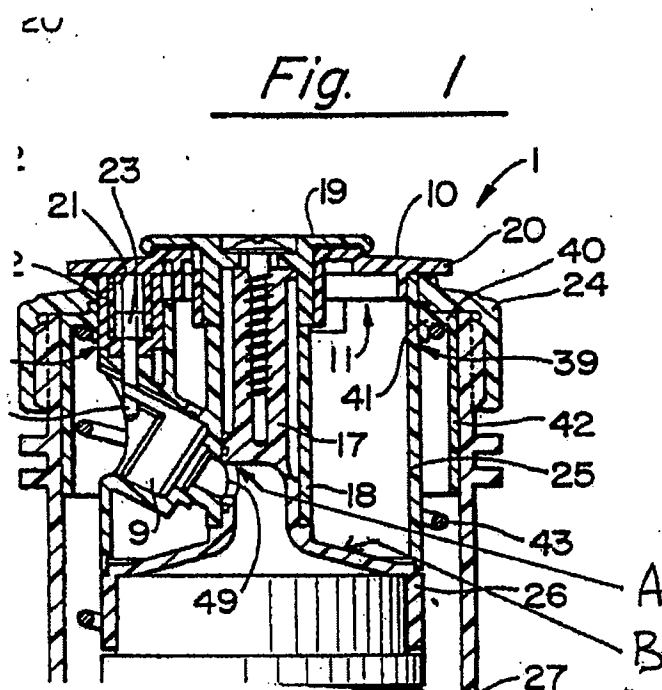
Lindermeir relates to a rotary-driven, pop-up sprinkler including multiple nozzles, and a valve which directs the flow of water to a selected one of the nozzles, or allows the water pressure to raise the sprinkler head for nozzle replacement or other maintenance by shutting off the flow to all the nozzles. In this respect, Lindermeir is similar to the present invention. However, the structure of Lindermeir is different from that of the present invention, and is more complex, and therefore more costly. Moreover, explained below, shut-off valves according to the present invention provide improved functionality in that they substantially reduce turbulence in the outgoing water stream when they are fully open, and also their operation does not disturb existing arc of coverage settings.

As best illustrated in Figures 1, 3, and 4 of Lindermeir, sprinkler **1** includes a sprinkler head **6** which carries three circumferentially spaced nozzle units **9**, one of which can be selectively connected to the incoming water supply by means of a valve described below, to produce a desired spray pattern. The valve may also be positioned to cut off the flow of water to all of the nozzles.

The valve, which is not specifically called out by reference number in the patent, is comprised of an internal cylindrical member **18** integral with and centrally located in sprinkler head **6**. The patent refers to this as a bearing sleeve, and it essentially functions as the body of a sleeve valve. Bearing sleeve **18** is integrally connected to three casing-like hollow spokes **48** which

communicate with the respective nozzle units 9. The spoke interiors communicate with the interior of bearing sleeve 18 by way of supply openings 49 in the jacket of the bearing sleeve 18.

A bearing shaft 17, which is an extension of the rotary drive mechanism for the sprinkler, is rotationally fixed relative to bearing sleeve 18, and is secured axially by a screw to a locking cover 19 at the top of sprinkler head 6. The lower end of shaft 17 is hollow, and in conjunction with a further tubular member 28, communicates with a water supply connected to a nipple 44. Water is supplied to a selected one of spokes 48, and hence to a selected one of nozzles 9 by selective alignment of a single opening in bearing shaft 17 with one of openings 49 in bearing sleeve 18 by rotation of sleeve 18 on shaft 17. The opening in bearing shaft 17 is unlabeled in the patent drawings, but is designated at "A" in the fragmentary copy of Fig. 1 reproduced below.



Bearing sleeve 18 is rotatable by means of a selecting mechanism including a nozzle selecting handle 10 and a circular disk-like gripping ring 20. The combined mechanism referred to

above is described in Lindermeir primarily at Col. 6, line 44 through Col. 7, line 6, and Col. 9, line 52 through Cl. 10, line 10.

It is noteworthy that bearing sleeve **18** and bearing shaft **17** is referred to in Lindermeir as forming "a type of slide valve", but a more apt translation of the original German specification may be "sleeve valve".

Further, as may be seen from the above-referenced description, Col. 9, lines 58 and 59 describe supply openings **49** as "positioned roughly radially", while Col. 9, line 60 describes the communicating opening in bearing shaft **17** as a "radial flow opening". This is noteworthy. As clearly illustrated in Fig. 3, openings **49** are oriented such that the direction of water flow into spokes **48** is aligned with the axial direction of reception flange **50** which forms the inlet end of the flow passages for the nozzles **9**. With opening **A** in bearing shaft being radial, the upwardly flowing water from inlet nipple **44** (see Fig. 1) must make a sharp right-angle turn through opening **A**, and a second obtuse-angle turn into opening **49**. These bends introduce turbulence into the water stream in the nozzle, with the result that the shape and uniformity of the nozzle outlet stream is disturbed. As will be appreciated, this makes it more difficult to achieve a desired water distribution pattern.

Also noteworthy is the fact that the arc of coverage setting mechanism is coupled to the central shaft **17**. Thus, rotation of sleeve **18** relative to shaft **17** to operate the valve disturbs an existing arc setting.

Independent claims 35, 48, 67, 114, and 115 are all directed to the elected species illustrated in Fig. 6, and are all patentable over Lindermeir. In particular, claim 67, which replaces claim 8, recites the following:

a nozzle housing having a main flow path formed therein for directing a flow of water received in the sprinkler assembly and a water stream outlet flow path through which water flowing through the flow path exits the sprinkler assembly;

a transition portion between the main flow path and the stream outlet flow path,

a nozzle removably mounted in the stream outlet for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing upstream of the nozzle for throttling or shutting off flow to said nozzle, the valve having a valve element, the valve element being movable within the nozzle housing flow path between open and closed positions to control water flow to the nozzle,

wherein a downstream end of the transition portion, an upstream end of the stream outlet flow path, and an opening in the valve element are all substantially aligned when the valve element is in the open position.

Lindermeir does not disclose, teach, or suggest a sprinkler assembly including a valve as described wherein a downstream end of a transition portion (the opening labeled A above), an upstream end of a stream outlet flow path (reception flange 50), and an opening (49) in the valve element (sleeve 18) are all substantially aligned when the valve element is in the open position. Instead, as described above, in Lindermeir, opening A in shaft 17 is radial, and opening 48 is aligned with the nozzle. Thus, the flow path bends, and the three parts are therefore not aligned when the valve is open. Claim 67 is patentable over Lindermeir for at least this reason.

Claim 35 recites the following:

a nozzle housing having a flow path therein for water received in the sprinkler assembly,

the flow path having a main portion extending along a central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing in the flow path exits the sprinkler assembly;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve including a conical valve element disposed in the nozzle housing flow path,

wherein movement of the conical valve element between open and closed positions controls water flow to the angled portion of the nozzle housing flow path.

New independent claim 114 also calls for a conical valve.

Lindermeir et al. does not disclose "a valve including a conical valve element". While Lindermeir appears to show a skirt (see part labeled "B" in the attached fragment of Fig. 1 of the patent) which is conical in shape, this element is rotationally fixed, and in any event, has nothing to do with controlling the flow of water. Claims 35 and 114 are patentable over Lindermeir for this reason alone.

Claim 48 recites the following:

a nozzle housing having a central axis and a flow path therein for water received in the sprinkler assembly,

the flow path having a main portion extending along the central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing through the flow path exits the sprinkler assembly;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing which is operable between open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path,

the valve being so constructed and configured that the parts thereof which control the water flow cause substantially no obstruction or turbulence in the nozzle flow path when the valve is in a fully open position.

Lindermeir does not disclose, teach, or suggest a sprinkler assembly including a valve which is ". . . so constructed and configured that the parts thereof which control the water flow cause substantially no obstruction or turbulence in the nozzle flow path when the valve is in a fully open position." In Lindermeir, opening A in shaft 17 extends radially through the cylindrical body thereof and thus the central axis of the opening is not aligned with the angled central axis of the passage defined by the respective spokes 48 for receiving the nozzle units 9. Consequently, the water stream must bend twice, once at opening A, and again at opening 48. These repeated changes in direction cause turbulence in the flow path and thus have a negative affect on the operation of the sprinkler.

There is no indication that Lindermeir even recognizes the existence of this turbulence, let alone any way to avoid it. Claims 48, 90 and 92 are accordingly also patentable over Lindermeir.

New claim 115 specifies that the actuator for the valve is "so constrectued that vmoving the valve does not disturb an existing arc setting. As discussed above, rotation of sleeve 18 relative to shaft 17 does disturb an existing arc setting.

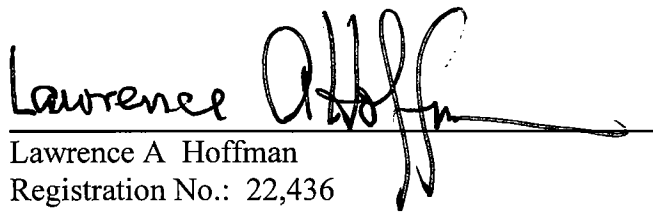
All the other claims are directly or indirectly dependent on one of claims 35, 48, or 67, and are patentable over Lindermeir for the various reasons discussed above. In addition, these claims recite features which, when considered in combination with their respective parent claims, and not disclosed, taught or suggested in Lindermeir, or any other prior art of record.

In view of the foregoing, favorable reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,

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